ent types of differential expansion measurements are supported including:

- Standard Differential Expansion
- Complementary Input Differential Expansion (CIDE)
- Standard Single Ramp Differential Expansion
- Nonstandard Single Ramp Differential Expansion
- Dual Ramp Differential Expansion

The differential expansion and thrust channels of the Position Monitor will accept signal inputs from the following Bently Nevada transducers:

- 5, 8, 11, and 14 mm 7200 Systems
- 8 mm 3300 System
- 25, 35, and 50 mm Extended Range Systems
- 50 mm Differential Expansion Transducer
- 3300 RAM System
- 3000 Series System

The Position Monitor can be configured for case expansion measurement on Channels 3 and 4 and will accept signal inputs from the existing Bently Nevada 24765 Case Expansion Transducer. Bently Nevada will soon manufacture a new High Temperature Case Expansion Transducer, which will have CE approval, an improved operating temperature of 85°C (185°F), and will be compatible with the Position Monitor.

The Position Monitor provides system flexibility and optimum channel utilization. Differential expansion measurements can be made on Channels 1 and 2 and case expansion measurements on Channels 3 and 4. If the turbine requires more than two channels of differential expansion measurements, Channels 3 and 4 can also be used for differential expansion, and the case expansion measurements can be moved to another Position Monitor. Any channels not used for differential expansion or case expansion can be configured for thrust measurements.

The 3500/45 Position Monitor is a component of Bently Nevada's new 3500 Machinery Data Management System. Contact your nearest sales representative for more information.

Famous names in rotor dynamics

William Rankine introduced much of the terminology and notation of thermodynamics still in use today

William J. Macquorn Rankine ('rang kin), 1820-1872, a "Renaissance" man dedicated to translating theoretical principles into practical terms in the Steam Age, may have also been responsible for setting back the science of rotor dynamics by nearly fifty years.

Rankine was born in Edinburgh, Scotland. He was the son of an army lieutenant and received his early schooling from his father. Although he was a successful student, trained in physics, he left the university before obtaining a degree. For four years, he worked as an apprentice on railroad and hydraulic projects, occasionally collaborating with his father. This experience seems to have gotten him interested in the study of heat and heat engines, and probably reinforced his drive to translate the remotely theoretical into the eminently practical.

He first started publishing papers on physical sciences topics in 1849. He ultimately produced a set of comprehensive engineering textbooks, including, "A Manual of the Steam Engine and Other Prime Movers," 1859, which brought thermodynamics to working engineers. In 1869, Rankine published the first work on the dynamics of rotating shafts, "Centrifugal Whirling of Shafts," Engineer, XXVI, April 9, 1869. This became a classical starting point of the new discipline known today as Rotor Dynamics, and ultimately, Rotating Machinery Dynamics.

Rankine was a professor at the University of Glasgow from 1855 until his death, a consultant, and a highly respected authority in a wide range of engineering and scientific topics. He was a bold thinker who freely invented terminology for the disciplines he was interested in. He introduced much of the terminology and notation of thermodynamics, most of which is still in use today. He coined the terms "potential energy" and "critical speed" among others.

It was his boldness and willingness to venture where others hadn't that had a negative effect on rotor dynamics for many years. Rankine's statement in 1865 that, "For every length of shaft there is a speed that cannot be exceeded, and for every speed there is a length of shaft that cannot be exceeded." was the first description associated with limits in machine operation. Though the rule is generally true, what he actually meant was that the first balance resonance was the speed limit for machine operation; this was incorrect. Unfortunately, the influence of this rule lasted over thirty years, even though de Laval showed that machines could run above their "critical" (balance resonance) speed in 1883.

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